

A STUDY OF FOUR SPECIES OF CIRSIUM NATIVE TO MEXICO

Gerald B. Ownbey
Department of Botany
University of Minnesota
St. Paul, MN 55108

Abstract: Four species of the subsection Radiata Petrak are described and discussed. English descriptions and synonymies are provided in each case. The following species are treated: C. acrolepis (Petrak) G. Ownb., stat. nov., C. pinetorum Greenm., and C. subuliforme G. Ownb., sp. nov. Additionally, C. acantholepis (Hemsl.) Petrak is reduced to its original component through the removal or reduction of two varieties recognized by Petrak.

F. Petrak's (1910, 1911, 1917) monumental and imposing studies of North American Cirsium are the beginning point for any subsequent taxonomic work based upon distributional and morphological criteria. Much of Petrak's work, however, rested upon the study of minimal numbers of specimens and though astonishingly detailed and well executed for his time these studies leave much room for improvement. The following paper embodies a portion of my own observations on Latin American cirsiums.

CIRSIUM ACROLEPIS (Petrak) G. Ownb., stat. nov.

Cirsium occidentale (Nutt.) Jeps. subsp. acrolepis Petrak, Bot. Tidsskr. 31: 66. 1911. Type collection: México: State of Guanajuato: Jaral, Aug., 1887, W. Schumann 163c. (HOLOTYPE: JE, not seen. ISOTYPE: US!).

Coarse biennial or short-lived perennial from a thick tap root, monocarpic; stems 1-2.5 m tall, stout, usually one from the crown or with one or more basal offshoots, branched in the upper one-half or one-third; stem surfaces white, thinly tomentose, also crisped-pubescent under the tomentum, often glabrescent with age, longitudinally striate; branches standing at an angle of about 30° from the main stem, short and stout, the largest often only 1-2 dm long, terminated by 1-5 heads; all the leaves white-tomentose beneath, thinly tomentose and grayish-green above, densely crisped-pubescent with multicellular hairs especially along the veins beneath under the tomentum; rosette leaves oblanceolate, 10-45 cm long, 4-10 cm broad, deeply lobed, the primary and secondary lobes spinescent; cauline leaves oblanceolate below, becoming elliptical to lanceolate upward, all of them deeply lobed, the main lobes of the middle cauline leaves frequently lanceolate and very strongly armed with spines to 1 cm or

more long, the secondary lobes and teeth also armed with lesser spines; all the leaves sessile, the middle and reduced upper ones often semiamplexicaul, not decurrent; heads erect, single and terminal or crowded into groups of 2-5 on peduncles 1-2 cm long; principal involucre about 3-4 cm wide, 2.5-3 cm high, the flowers exceeding the phyllaries by about 1 cm at anthesis; all the phyllaries except the innermost purplish, straight, spreading, salient, not at all reflexed, subulate, evenly tapered from the 3-4 mm wide base, the back rounded to definitely angular-carinate in the outer one-third, terminated by a stout spine 5-10 mm long, the exposed backs of the outer and middle phyllaries arachnose or thinly tomentose at first, later glabrate; tips of the innermost phyllaries flattened, not at all expanded laterally, gradually tapered to a much prolonged tip terminated by a fine point, flexuous, innocuous; corolla lavender, 27-32 mm long (ave. 30 mm), the tube 8-12 mm long (ave. 10 mm), the limb 17-23 mm long (ave. 19.5 mm), the throat gradually tapered into the tube, the junction marked only by a dark line (in dried specimens) where the filaments of the stamens are attached, the longest lobe 7.5-11.5 mm long (ave. 9 mm), the tips of the lobes acuminate; anther tips 0.8-1.0 mm long, slender, attenuate; style included in early anthesis to exerted to 4 mm in late anthesis, the style above the node 3.0-4.5 mm long (ave. 3.8 mm); filaments pubescent; pappus tawny, the longest bristles 17-23 mm long, little if at all thickened distally; seeds of uniform color, light brown, not streaked, 2.0-2.4 mm wide, 5.0-6.5 mm long, the distal band obscure.

Chromosome number: $2n = 34$ (Ownbey, 1968, p. 341).

Petrak (1911, p. 67; 1917, p. 500), sets forth the basis for separating his subsp. acrolepis from the other subspecies of C. occidentale recognized by him. Of the reasons given, the more significant are the very prickly leaves, the shortened branches and the stiff, straight, distinctly keeled phyllaries in C. acrolepis. A careful comparison of specimens from Santa Barbara, Los Angeles and San Bernardino counties, California, typical of the original component of C. occidentale, with a long suite of specimens from throughout the range of C. acrolepis in Mexico reveals other differences of significance. Differences in the dimensions of the corolla are as follows, those for C. acrolepis before C. occidentale in each case: total length of the corolla, 27-32 mm vs. 33-38 mm; length of the tube, 8-12 mm vs. 15-17 mm; length of the limb, 17-23 mm vs. 18-21 mm; length of the longest lobe, 7.5-11.5 mm vs 11-12 mm. Thus, it is evident that the flowers of C. acrolepis are shorter by several mm and that most of the difference is accounted for by the length of the tube which is shorter by 5 mm or more in C. acrolepis. The lobes, too, are significantly shorter, by up to 4 or 5 mm in C. acrolepis. The longest bristles of the pappus in C. acrolepis are much shorter, i.e., 17-23 mm and tawny in color, while in C. occidentale they are usually 26-30 mm long and white in color. Other vegetative differences between the two not emphasized by Petrak are the much stiffer, more rigid phyllaries with longer, stouter terminal spines in C. acrolepis. All of these differences together with the wide disjunction between their respective ranges provide ample basis for according C.

acrolepis full specific rank. In my estimation *C. occidentale* s.s. bears a closer superficial resemblance to *C. pinetorum* and *C. subuliforme* as dealt with in this paper than it does to *C. acrolepis*. *C. pinetorum* (as *C. acantholepis* var. *pinetorum*) along with *C. acantholepis* s.s. as circumscribed here (including both the typical variety and var. *heterolepis* Petrak) along with *C. orizabense* Sch. Bip. ex Klatt and *C. radians* Benth. were assigned to the subsection *Radiata* by Petrak. Petrak assigned *C. occidentale* to his preceding subsection *Campylophylla*, series *Occidentalia*. It could be argued that *C. occidentale* s.s. should be assigned to the subsection *Radiata* at least provisionally. *C. subuliforme* and *C. acrolepis* also belong to this subsection.

Cirsium acrolepis is widely distributed on the lower slopes and foothills of the Sierra Madre Oriental in northeastern Mexico from Guanajuato, Querétaro, and Hidalgo in the south to Tamaulipas and Nuevo León in the north. Herbarium labels indicate that its altitudinal distribution is from 1600 to 2600 m. It is often found in dry barren terrain in the chaparral province, in disturbed places along roadways as well as under more moist situations along drainages, in canyons, etc., along with other native species.

The fact that it is collected so often along roadways indicates that it may be a pioneer species and may spread into disturbed habitats in and beyond its natural range.

Specimens examined: COAHUILA: 15 miles (24 km) south of Arteaga, Kenoyer & Crum 2725 (MICH); Cañon de la Barrica, 27° 01' 45" N, 102° 23' 17" W, Wendt & Lott 1379 (ASU); Rancho Agua Dulce, Sierra de San Manuel, Municipio de Múzquiz, Wynd & Mueller 381 (MO, NY, US). GUANAJUATO: 11.8 miles (19 km) north of turnoff to San José Iturbide, Rte. 57, Ownbey & Johnson 3721 (MIN). HIDALGO: El Rodeo, municipio de Zimapán, Gonzales Quintero 1086 (ENCB, MIN); 5 km west of Cardonal, King 6408 (MIN, US); ca. 30 miles (48 km) north of Ixmiquilpan, King 4207 (MIN, NY, US, TEX); Cerro Juárez, cerca de Tasquillo, Paray 2035 (ENCB); 11 miles (17.7 km) east of Huichapan, Ownbey & Johnson 3753 (MIN); 2 miles (3.2 km) north of Zimapán, Ownbey & Johnson 3782 (MIN); Ixmiquilpan, Rose et al. 9080 (NY, US). NUEVO LEÓN: Galeana, Chase 7756 (MICH, MO); Cerro del Chipinque, Monterrey, Díaz s.n. (ENCB); 5 miles (8 km) east of Galeana on road to Linares, Ownbey & Johnson 3715 (MIN); near Ojo de Agua above Galena, Sharp 45670 (NY). QUERETARO: between Cadereyta and Vizarron, Rose et al. 9733 (US). SAN LUIS POTOSÍ: Charcas, Lundell 5380 (US); Minas de San Rafael, Sierra de Guascama, Purpus 5135 (MO, NY, US); ca. 4 miles (6.4 km) east of Rayón, Rte. 86 between Cd Valles and Rfo Verde, Ownbey 4166 (MIN); Santa Marfa del Río, Rzedowski 3260 (ENCB); "Flora Mexicana ex convalli San Luis Potosí", Schaffner 324 or 749 (MICH, NY, US). TAMAULIPAS: vicinity of San José, La Vegonia, Bartlett 10081 (MICH, US); vicinity of San José, Tres Vetas, Bartlett 10372 (MICH, US); 19 km southeast of Miquihuana on road to Palmillas, Stanford et al. 850 (MO, NY).

CIRSIIUM PINETORUM Greenm.

Cirsium pinetorum Greenm., Proc. Amer. Acad. Arts 41: 267. 1905. Type collection: México: State of Puebla: Pine forests, Honey Station, altitude 1765 m, 15 Sept., 1904, C. G. Pringle 8884. (HOLOTYPE: GH, not seen. ISOTYPES: K, not seen, color transparency at MIN!, MSU; LL!, MIN!, MSU!, NY!, US!). Not Carduus pinetorum Small, Fl. Southeastern United States, p. 1308. 1903.

Cirsium acantholepis (Hemsl.) Petrak. var. pinetorum (Greenm) Petrak, Beih. Bot. Centralbl. 27 (Abt. 2): 212. 1910.

Biennial or short-lived perennial, evidently monocarpic; stems 1-2 m tall, single or several from the base, branched above, each branch terminated by a head and sometimes each main branch also with one or more short secondary branches, each terminated by a head; surfaces of the stems thickly tomentose with tawny hairs, especially when young, glabrate in age, also copiously crisped-hispid with flattened, septate hairs; rosette leaves narrowly oblanceolate, about seven times longer than broad, shallowly divided, the main lobes deltoid and again toothed, the teeth deltoid, rather prickly marginally, the largest prickles 5 mm or more long; largest basal leaves to 15 cm wide, 50 cm long, deeply incised to within about 1 cm of the midrib, the main lobes lanceolate, the major secondary lobes 1-3, deltoid, all the vein ending spine-tipped, the terminal spine of the main lobes 5-10 mm long; lower and middle cauline leaves narrower, to 5 cm broad and 30 cm long, more shallowly lobed, distinctly amplexicaul at the broad base, not at all decurrent; uppermost leaves greatly reduced, about 5-10 cm long, lanceolate, the margin with deltoid teeth, the apical spine to 10 mm long, the marginal spines weaker; all the leaves heavily tomentose beneath, green above and closely hispid with crisped, septate hairs; heads erect when young, nodding at maturity, to about 6.5 cm broad, 4.5 cm high, closely subtended by 5 or more marginally and apically spinescent foliar bracts, these intergrading imperceptibly into the outermost phyllaries, 1-3 cm long; true phyllaries not spinescent at the margin, subulate, the margins straight, the midvein prominent, about 3 mm broad at the base, erect or spreading at first, the outermost evidently reflexed at maturity, a little shorter than the middle and inner phyllaries; middle and inner phyllaries 3-5 cm long; all of the phyllaries tipped by a slender spine; tips of the inner most phyllaries not at all expanded laterally, innocuous, about equalling the corollas at anthesis; exposed backs of the phyllaries thickly arachnose but soon glabrate, purple, the margins persistently arachnose; receptacle convex, much broader than high; corollas evidently white or pale lavender, 20-24 mm long (ave. 22.5 mm), the tube 10-13 mm long (ave. 11 mm), well differentiated from the limb, the limb 10-13 mm long (ave. 11 mm), about equalling the tube, the longest lobe 5.5-7 mm long (ave. 6.4 mm); anther tips 0.7-0.9 mm long, slenderly attenuate; style exerted to 4-6 mm, the style above the node 3.5-4.5 mm long, purplish; filaments pubescent; pappus tawny, the longest bristles 18-22 mm

long (ave. 19.5 mm), some of the bristles a little thickened distally; seeds not seen.

Cirsium pinetorum is undoubtedly closely allied to *C. subuliforme* G. Ownb. At this writing, I have not seen mature plants of the former in the field. As compared to *C. subuliforme*, the plants evidently are sturdier and, based upon herbarium studies, the stems are much more tomentose, the upper surfaces of the leaves more hispid and the pappus bristles shorter. More important, perhaps, is the difference seen in the proportions of the corolla. In *C. pinetorum* the tube and limb are sub-equal, each about 10-12 mm long; in *C. subuliforme* the tube is much longer than the limb, i.e., the tube 15-20 mm long (ave. 17.5 mm), the limb 10-13 mm long (ave. 11 mm). It may be significant that *C. pinetorum* grows at somewhat lower elevations.

The type collection of *C. pinetorum* was made in "pine forests", but later collections indicate more open, sometimes disturbed habitats that may once have been partially forested. As nearly as can be ascertained at present the altitudinal range of the species is 1600-2200 m.

Specimens examined: HIDALGO: 18.5 miles (29.8 km) east of Pachuca, on Rte. 130 to Tulancingo, Ownbey & Johnson 3756 (MIN). PUEBLA: 1 mile 1.6 km south of Honey Station, Jackson 1051 (MIN); arriba de Huauchinango, Paray 2097 (ENCB); along Río Zotalapa, Huauchinango, alt. 6500 ft (1980 m), Sharp 441254 (NY).

CIRSIUM SUBULIFORME G. Ownb., sp. nov.

Herba biennis radice palari. Caulis plerumque 1, 1-2 (-3) m altus, simplex vel ramosus, tomentulosus sub juventute, glabratus, pilis crispis septatis hispidus. Rami 0-5, monocephali, elongati. Folia subtus tomentosa, supra sparsim sericea, crispo-pubescentia, lobata. Folia basalia 2-5 cm lata, 10-40 cm longa, oblanceolata. Folia superna et mediana caulina anguste elliptica, maximam partem 3-4.5 cm lata, spinis exclusis 12-20 cm longa, amplexicaulia. Folia caulina suprema lanceolata, multum diminuta, distantia, spinis 5-10 mm longis. Capitula sub maturitate nutantia. Involucrum 4-6 cm latum, 3-5 cm altum, basi depressum, bracteis foliaribus 3-5, 1-3 cm longis, spinescentibus margine et ad apicem arcte subtentum. Phyllaria 2-3 mm ad basem lata, margine spinis carentibus, subulata, marginibus rectis, nervo medio prominenti. Phyllaria exteriora reflexa, 2-3 cm longa, media interioraque expansa ad erecta, 3-5 cm longa, apice spinescenti spinis ca. 5 mm longis. Apices phyllariorum intimorum innocui, hispido-ciliati, sub anthesi corollam aequantes vel excedentes. Dorsa phyllariorum exposita dense arachnoidea, cito glabrata, purpurea. Receptaculum convexum, multum latius quam profundum. Corollae albae, lobis aliquando dilute lavandulaceis, 26-33 mm longae (medium arithmeticum 29 mm), tubo 15-20 mm longo (medium arithmeticum 17.5

mm), limbo 10-13 mm longo (medium arithmeticum 11 mm) gradatim in tubum angustato, lobis corollae 4.6-6.4 mm longis (medium arithmeticum 5.4 mm). Apices antherarum 0.6-1.0 mm longi, attenuati. Stylus exsertus 2-5 mm trans corollam, ramis supra nodum 3.4-4.4 mm longis. Pappus fulvus, setis longissimis 24-30 mm longis. Semina straminea, purpureo-vittata, 1.8-2.2 mm lata, 4.4-5.6 mm longa, vitta distali obscura, ca. 0.2 mm lata.

Type collection: México: State of Morelos: 7.6 miles (12.2 km) south of Estación Parres (El Guarda), Rte. 95D from Mexico City to Cuernavaca, alt. ca. 9000 ft (2740 m), Ownbey & Muggli 3996. (HOLOTYPE: MIN. ISOTYPE: ENCB).

Chromosome number: $2n = 34$. See below for full citations. DISTRITO FEDERAL: Ownbey & Muggli 3997, 17 pr., 1 plant. ESTADO DE MEXICO: Ownbey & Muggli 3952, 17 pr., 1 univalent, occasionally 16 pr., 1 trivalent, 1 plant; Ownbey & Muggli 3954, 17 pr., 5 plants.

Biennial or short-lived perennial, usually monocarpic; stem 1-2 (-3) m tall, from a stout tap root, usually one from the crown, simple or with 1-5 branches in the upper one-third, the branches much elongated, usually monocephalous, the uppermost leaves distant and much reduced, the heads nodding except when very young; stem surfaces at first more or less silky or thinly tomentose with white or sordid hairs, later glabrate, also crisped-hispid with septate hairs; earliest seedling leaves narrowly obovate, merely toothed and prickly at the margin; rosette leaves elliptic-obovate to oblanceolate, 2-5 cm wide, 10-40 cm long, the blade divided one-third to one-half the way to the midrib, the lobes broadly deltoid, again toothed, all the veins ending in a weak prickle; lowest cauline leaves like those of the rosette to very narrowly elliptical; middle and upper cauline leaves successively more lanceolate and reduced in size, the base broad and definitely amplexicaul, the lanceolate lobes of the bracteate uppermost leaves strongly armed with spines to 10 mm long; all the leaves tomentose beneath, the upper surfaces green, pubescent with numerous flattened, crisped, septate hairs and sometimes also very thinly silky with white hairs; heads nodding at maturity, the involucre 4-6 cm broad, 3-5 cm high, broader than high, depressed at the base, closely subtended by 3-5 foliar bracts, these spinescent both marginally and apically, mostly 1-3 cm long including the apical spine, transitional in nature to the outermost phyllaries; phyllaries not spinescent at the margins except possibly the very outermost ones, subulate, the margins straight, the midvein prominent, about 2-3 mm broad at the base, the outer phyllaries reflexed, 2-3 cm long, the middle and inner ones spreading to erect, 3-5 cm long; outer and middle phyllaries tipped with a sharp spine, this to about 5 mm long, the innermost phyllaries innocuous, not at all expanded laterally; inner phyllaries equal to or exceeding the corollas at anthesis, the tip hispid-ciliate; exposed backs of all the phyllaries densely arachnose but soon glabrate, purple; receptacle convex, much broader than deep; corollas white, the lobes sometimes tinged with lavender, 26-32 mm long (ave. 29 mm), the tube 15-20 mm long

(ave. 11.5 mm), the limb 10-13 mm long (ave. 11 mm), the limb gradually tapered into the tube and the junction indefinite, the longest lobe 4.6-6.4 mm long (ave. 5.4 mm); anther tips 0.6-1 mm long, slender, attenuate; style exerted 2-5 mm, the style above the node 3.4-4.4 mm long, purplish; filaments pubescent; pappus tawny, the longest bristles 24-30 mm long, little if at all thickened distally; seeds straw-colored, streaked with purple or rarely purple-black, 1.8-2.2 mm wide, 4.4-5.6 mm long, the distal band obscure, to 0.2 mm wide.

Recent collectors seem to have identified *C. subuliforme* as *C. subcoriaceum* (Less.) Schz. Bip., *C. acantholepis* (Hemsl.) Petrak or *C. pinetorum* Greenm. Petrak (1910, 1911) cites no specimens that can be placed under *C. subuliforme*. Differences between *C. subuliforme* and *C. pinetorum* which it most closely resembles are discussed under the latter species.

Cirsium subuliforme is a very common species found in open pine, fir and oak woods or in grassy areas at altitudes of 2400-3400 m, from the western part of the State of México to the states of Morelos, Puebla and Vera Cruz.

Specimens examined: DISTRITO FEDERAL: 2 km south-southwest of La Cima railroad station, Rte. 95, alt. 3050-3100 m, Iltis et al. 939 (MIN, WIS); El Zarco, Sierra de las Cruces, alt. 3000m, Jiménez R. s.n. (ENCB, MIN); pedregal near Ajusco, alt. 2700 m, Matuda 18993 (US); 4 km al este del Ajusco, alt. 2750 m, López G. 12 (MIN); C. Sta. Rosa, Contreras, alt. 2800 m, Matuda 18786 (NY, US); Volcan Xitle, alt. 2700 m, Matuda 19601 (NY, US); 5 miles (8 km) south of Estación Parres (El Guarda), Rte. 95D, alt. 9500 ft (2900 m), Ownbey & Muggli 3997 (MIN); cerca del Cerro Conejo, al ENE de Ajusco, alt. 2750 m, Rzedowski 24126 (ENCB). ESTADO DE MEXICO: entrée du Sierra Nevado de Toluca, Octubre, 65 (i.e., 1865), Hahn 846 (K, not seen, color transparencies MIN!, MSC); Sn Lázaro (Camino de Toluca), Lyonnet 440 (US); C. Venacho, Amecameca, alt. 2800 m, Matuda 25748 (NY, US); ca. 20.5 miles (33 km) east of Zitácuaro (5 miles east of the state line), Rte. 15, alt. ca. 9000 ft (2740 m), Ownbey & Muggli 3952 (MIN); 22 miles (35.4 km) east of Zitácuaro (6 miles (9.7 km) east of the state line), Rte. 15, alt. 9000 ft (2740 m), Ownbey & Muggli 39534 (MIN); 6 km southwest of Río Frío, km 56 on old highway 190, alt. 3000 m, Roe et al. 1457 (MIN, WIS). HIDALGO: Cerro de las Ventanas, 6 km al N de Pachuca, alt. 2900 m, García 89 (ENCB, MIN). MORELOS: Toro, alt. 9800 ft (3000 m), Fisher 177 (US); 7.6 miles (12.2 km) south of Estación Parres (El Guarda), Rte. 95D, alt. 9000 ft (2740 m), Ownbey & Muggli 3996 (MIN). PUEBLA: near San Andrés, above Serdan, Cabacero, alt. 8500 ft (2590 m), Sharp 441045 (NY); between Acatzingo and El Seco, alt. 8000 ft (2440 m), Sharp 441320 (NY). VERA CRUZ: Cofre de Perote, northwest side of mountain, alt. 3400 m, Beaman 2192 (MSU).

CIRSIUM ACANTHOLEPIS (Hemsl.) Petrak, Beih. Bot. Centralbl. 27 (Abt. 2): 211. 1910.

Cnicus acantholepis Hemsl., Biol. Cent. Amer., Bot. 2: 251. 1881-1882. Type collection: México: State of Mexico: Vallée de México, Santa Fe, 17 Août, 1865-1866, M. Bourgeau 714. (HOLOTYPE: K, not seen; color transparencies of holotype, MIN!, MSU).

Carduus acantholepis (Hemsl.) Greene, Proc. Acad. Nat. Sci. Phila. 1892: 363. 1893.

Cirsium acantholepis var. *heterolepis* Petrak, Beih. Bot. Centralbl. 27 (Abt. 2): 212. 1910, only as to Pringle 3237. Type collection: México: State of México: Calcareous bluffs, Flor de María, 31 August, 1890, C. G. Pringle 3237. (HOLOTYPE: B?, not seen. ISOTYPES: MICH!, MIN!, MO!, MSU!, US!). Not *Cirsium heterolepis* Benth., Plantae Hartwegianae, p. 87, 1839-42 = *Cirsium subcoriaceum* (Less.) Schz. Bip.; not *Carduus heterolepis* Greene, Proc. Acad. Nat. Sci. Phila. 1892: 363. 1893, = *Cirsium anartiolepis* Petrak.

Biennial or short-lived perennial, evidently monocarpic; stems 1.5 m or more tall, from a stout tap root, simple below, with 3-5 short branches near the top, or in more vigorous plants, widely branched from near the base, the primary branches monocephalous or with one or more short secondary branches near the outer end each of which terminates in a head; surfaces of the stem silky with long, appressed, white hairs, and also sparingly pubescent with crisped, septate, flattened hairs; largest basal leaves 5-14 cm wide, 15-35 cm long, broadest just above the middle, the blade divided from three-fourths to nine-tenths the distance to the midrib, the primary lobes again divided into lanceolate or oblong-lanceolate lobes, the basal lobes of the blade reduced to spines; middle and upper leaves similarly divided, progressively reduced upward, sessile and not at all amplexicaul or decurrent, the blade of the uppermost leaves very reduced, the primary and secondary lobes lanceolate and strongly spinescent, the terminal spine to 10 mm or more long; under surfaces of the leaves thickly tomentose; upper surfaces silky-lanate when young, glabrate, also rather copiously crisped-hispid with septate hairs; young heads erect; mature heads nodding; body of involucre (not including the prolonged phyllary appendages) about 3-4.5 cm wide, 2.5-3 cm high, impressed at the base; phyllaries consisting of an appressed, lanceolate, imbricate base terminated by a well-developed green appendage; exposed back of basal segment of all the phyllaries obscurely but closely puberulent; appendages of the outer phyllaries reflexed, those of the middle phyllaries squarrose or spreading, the appendages of both the outer and middle phyllaries thinly arachnose, aceriform, mostly 2.5-3.5 cm long, including the apical spine, pectinate-spinulose at the margin with 3-5 spinules per side, the spinules 5-10 mm or more long; appendages of the inner phyllaries expanded laterally, scarios, crisped, abruptly long-attenuate at the tip, innocuous, erose at the margin, about 1.5-2 mm wide and 4-7 mm long, shorter than the corollas; receptacle only a little convex, about 5 times broader than high;

corollas at anthesis exceeding the innermost phyllaries, white or the tips of the lobes tinged with lavender, 20-25 mm long (ave. 22 mm), the junction of tube and limb definite, the tube 11-13 mm long (ave. 12 mm), the limb 9.5-12 mm long (ave. 10 mm), the longest lobe 3.5-5 mm long (ave. 4 mm); anther tips attenuate, about 0.8 mm long; style included or exerted 1-2 mm; style above the node 2-3 mm long, purplish; filaments pubescent; pappus tawny, the longest bristles 15-22 mm long (ave. 18 mm), the apices of some of them thickened; seeds 2-2.5 mm broad, 5-5.5 mm long, straw-colored, more or less streaked with purple, the distal band obscure, to 0.2 mm wide.

Chromosome number: $2n = 34$ (Ownbey et al., 1976, p. 299).

An excellent color transparency of the holotype was sent to me by Dr. John H. Beaman. The plant shown has a single main axis terminated by the primary head. Below the primary head, at intervals of a few cm, there are five short secondary axes, each one terminated by a single head. Details of phyllary morphology which are of greatest value in recognizing this species are also visible in the photograph.

Cirsium acantholepis var. *heterolepis* Petrak was proposed to accommodate erect plants with elongate, monocephalus branches and more or less nodding heads. The axes of plants of this description when observed in the field are indeed sometimes monocephalous but also are sometimes seen to have one or more additional heads disposed on short lateral branches arising a short distance below the terminal head. The essential difference between the species s.s. and the variety, viz., the number and disposition of the heads on the axes is, therefore, manifestly one of degree and is related to the vigor of the plants.

In Petrak's original diagnosis of *C. acantholepis* var. *heterolepis* two collections were cited, Pringle 2435 and Pringle 3237. Neither collection is stated to be the type collection. In a later publication, however, Petrak (1911, p. 65) removed Pringle 2435 to form the basis of a new species, *C. anartiolepis*. The sole remaining collection cited under var. *heterolepis*, Pringle 3237, therefore becomes the type collection for the variety..

Cirsium acantholepis is found in open pine or oak woods and in adjacent treeless areas of mountain slopes at altitudes of 2200-3000 m. Distributionally, so far as is known, it is confined to the Federal District and the State of Mexico. The majority of specimens seen have come from the western and northern parts of the state.

Specimens examined: DISTRITO FEDERAL: El Desierto de los Leones prope La Venta, Juzepczuk 231 (LL); 3 miles (4.8 km) east of the Puerto de las Cruces, alt. 9000 ft (2740 m), Ownbey & Muggli 3999 (MIN). ESTADO DE MEXICO: Santa María Tlalmimilopan, cerca de Lerma, alt. 2800 m, Franco 66 (ENCB); Jilotepec, alt. 2200 m, Matuda 26685 (NY); 20.5 miles (33 km) east of Zitácuaro (5 miles (8 km) east of the state line), Rte. 15, alt. 9000 ft (2740m), Ownbey & Muggli 3953 (MIN); 22 miles (35.4 km) east of Zitácuaro, alt. 9000 ft (2740 m), Ownbey & Muggli 3955 (MIN); 12.8 miles (20.6 km) from Toluca on the road to Nevado de Toluca,

alt. 9000 ft (2740 km), Ownbey & Muggli 4010 (MIN); Sierra de Guadalupe al norte de la Ciudad de México, Paray 902 (ENCB).

I wish to express my thanks to the curators of the herbaria cited for the use of the specimens housed at their respective institutions. I am especially grateful to Dr. J. Rzedowski who made available recent collections at ENCB. Over the years Drs. H. H. Iltis and R. M. King have sent numerous specimens from their Mexican Cirsium collections for which I thank them. Nearly two decades ago Dr. J. H. Beaman sent me a long series of color transparencies of types and other authentic specimens of North American Cirsium photographed in various herbaria in Europe and North America. These transparencies have since proved indispensable to my studies and I express my continuing indebtedness to Dr. Beaman for his generosity. The Latin description was prepared by Mr. P. M. Eckel. Costs of publication were met from the Junior F. Hayden Fund, University of Minnesota.

LITERATURE CITED

- Petrak, F. 1910. Die mexikanischen und zentral-amerikanischen Arten der Gattung Cirsium. Beih. Bot. Centralbl. 27 (Abt. 2): 207-255.
- _____. 1911. Beiträge zur Kenntnis der mexikanischen und zentral-amerikanischen Cirsien. Bot. Tidsskr. 31: 57-72.
- _____. 1917. Die nordamerikanischen Arten der Gattung Cirsium. Beih. Bot. Centralbl. 35 (Abt. 2): 232-567.
- Ownbey, G. B. 1968. Cytotaxonomic notes on eleven species of Cirsium native to Mexico. Brittonia 20: 336-342.
- _____, P. H. Raven, and D. W. Kyhos. 1976. Chromosome numbers in some North American species of the genus Cirsium. III. Western United States, Mexico, and Guatemala. Brittonia 27: 297-304.